bladder base and urethral radiation injuries. Our ability to predict these injuries prior to radiotherapy remains limited, however. For example, rectal dose volumes are a widely used planning tool, but published relationships between irradiated volumes and outcomes are inconsistent.
The presentation is a strictly clinical overview of the factors that contribute to ano-rectal radiation injuries and outlines recent progress in their management. Symptomatology resulting from rarely cited injuries, such as to the per-rectal fat and the pelvic floor musculature, are also discussed.

Symposium with Proffered Papers: Immobilisation, localisation and verification during image guided brachytherapy

SP-0032
Influence of immobilisation and implant stability during brachytherapy

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Abstract not received.

SP-0033
Role of target and applicator localisation under treatment delivery conditions

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Since the last 10 years 3D image-guided brachytherapy using CT, MRI, and/or ultrasound (US) has been introduced into clinical practice worldwide enabling conformation of the dose distribution to the target volume and avoidance of high dose to organs at risk (OAR). To be able to optimise the dose distribution in brachytherapy both the anatomy (target volume/OAR) *and* the applicator(s) should be correctly localised in the images. If the image modality does not enables both of these criteria the dose delivered the patient may be calculated incorrectly. Another important aspect is that the images should reflect the true situation at the time of the treatment. Due to the large dose gradient in brachytherapy, even small changes in the position of the applicator and/or anatomical structures may lead to discrepancies between planned and delivered dose. Usually, this is achieved with as short time as possible between imaging and treatment delivery.
The optimal image modality to use is depending on the site to be treated as well as the geometry and the material of the applicator. For cervical cancer MR imaging is the optimal modality to discriminate soft tissue and tumour. Concepts for image guided cervical brachytherapy have been developed by GEC-ESTRO and T2 weighted MR imaging is the preferred modality. In an interobserver study the mean inter-delineation distance of around 4 mm were found for the high risk CTV (HR CTV). The impact of these uncertainties for D90 and D100 (dose to 90% and 100% of the volume) were 10% and 19%, respectively.
Post-implant dosimetry after permanent prostate seed implantation is usually based on CT imaging. However, MR imaging has superior soft tissue contrast and is some times used nowadays. In an interobserver study the dosimetric consequence of the delineation uncertainty was estimated to be 18% for the prostate D90 when T2 and T1 weighted MR images were used. This figure was increased to 23% when the delineation was done on CT images.
Functional MR imaging, such as dynamic-enhanced MR, diffusion weighted imaging and MR spectroscopy, gives the opportunity to image microenvironmental characteristics of a tumour. Specific areas within the target volume with a high burden of disease or with biological characteristics indicating radioresistance may be targeted for higher dose delivery.
Even though MR imaging is excellent for target delineation, localisation of the applicators (i.e. the source path) or the seeds could be challenging. Some applicators (e.g. steel applicators or shielded applicators) are not even MR compatible. In general it is easier to visualise the applicator and source(s) in CT images. For rigid MR compatible applicators (e.g. plastic tandem-ring-applicator) so called library applicator files could be used. Then applicator file, including information about the applicator surface dimensions and the source path, can be imported into the MR images and rotated and translated until it matches the images. In some situations the needle tip could be difficult to localise in MR images. Then supplementary imaging could be used (e.g. CT) and image registration should be performed with the aim of matching the applicator geometry and not the bony anatomy. The dosimetric consequences of uncertainties in the applicator localisation are smaller compared to consequences of uncertainties in the target delineation. For the HR CTV D90 an average of 2% change per mm displacement of a ring applicator has been found in all directions.
Transrectal US (TRUS) is extensively used in prostate brachytherapy and gives an excellent view of the prostate gland. However, the presence of needles will preclude the image quality. Additionally, localisation of the needle tip could be challenging during needle reconstruction.
TRUS-based brachytherapy procedure offer a method for interactive treatment planning and, thus, short time between imaging and treatment delivery. Several groups have developed methods for “in treatment room” imaging with both CT and MR. However, for the latter method, challenges due to non MR compatible equipment is substantial.

SP-0034
Importance of treatment delivery verification

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Abstract not received.

OC-0035
Catheter displacement and dosimetry for single fraction MRI guided focal prostate HDR brachytherapy

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Purpose/Objective: The aim of this study is to analyze the effect of catheter displacement and anatomical variations (prostate and organs at risk) on the dose distribution in MRI guided single fraction high dose rate (HDR) focal brachytherapy of the prostate.
Materials and Methods: Twenty-two patients were treated with MRI guided focal HDR brachytherapy (Iridium-192) in a single fraction of 19 Gy. A multiparametric MRI was used to define the tumor region and was matched with the intraoperative ultrasound (US). For the treatment, self-anchoring umbrella catheters were used (1). For dose